

## CLAIMS

1. A method for precluding elution of lead from a plumbing device made of a copper alloy that includes a valve and a tube coupling, comprising washing at least a liquid-contacting part of the plumbing device made of a copper alloy containing lead with a cleaning fluid incorporating therein nitric acid and hydrochloric acid as an inhibitor under conditions of a temperature and a duration permitting effective removal of lead, thereby deleading a surface of the liquid-contacting part and causing the hydrochloric acid to form a coating film on the surface of the liquid-contacting part to effectively preclude elution of lead from the surface of the liquid-contacting part in the presence of the coating film.
2. A method for precluding elution of lead and nickel from a plumbing device made of a copper alloy that includes a valve and a tube coupling, comprising washing at least a liquid-contacting part of the plumbing device of a copper alloy containing both or either of lead and nickel with a cleaning fluid incorporating therein nitric acid and hydrochloric acid as an inhibitor under conditions of a temperature and a duration permitting effective removal of both or either of lead and nickel, thereby performing at least one of deleading treatment and nickel-removing treatment for a surface of the liquid-contacting part and causing the hydrochloric acid to form a coating film on the surface of the liquid-contacting part to thereby effectively precluding elution of both or either of the lead and nickel from the surface of the liquid-contacting part in the presence of the coating layer.
3. A method according to claim 1 or claim 2, wherein the hydrochloric acid as an inhibitor in the cleaning fluid is caused to form a film of  $\text{Cl}^-$  ions on the surface of the liquid-contacting part.

4. A method according to any one of claims 1 to 3, wherein the nitric acid has a concentration  $c$  in a range of  $0.5 \text{ wt\%} < c < 7 \text{ wt\%}$  and the hydrochloric acid has a concentration  $d$  in a range of  $0.05 \text{ wt\%} < d < 0.7 \text{ wt\%}$  in the cleaning fluid.
5. A method according to any one of claims 1 to 4, wherein the temperature is set at a level of not lower than  $10^{\circ}\text{C}$  and not higher than  $50^{\circ}\text{C}$ .
6. A method according to any one of claims 1 to 5, wherein the duration is set in a range of 20 seconds to 30 minutes.
7. A method for precluding elution of lead from a plumbing device made of a copper alloy that includes a valve and a tube coupling, comprising at least a degreasing step, a cold water-washing step subsequent to the degreasing step, an acid-pickling step and a cold water-washing step subsequent to the acid-pickling step.
8. A method for precluding elution of lead from a plumbing device made of a copper alloy that includes a valve and a tube coupling, comprising at least a degreasing step, a cold water-washing step subsequent to the degreasing step, a plating step, an acid-pickling step and a cold water-washing step subsequent to the acid-pickling step.
9. A method according to claim 8, which further comprises a deleading step prior to the plating step.
10. A method according to claim 8 or claim 9, wherein the deleading step uses a cleaning fluid identical in composition and concentration with a cleaning fluid for the acid-pickling step.

11. A method according to claim 9 or claim 10, wherein the cleaning fluid used in the deleading step is reused as the cleaning fluid in the acid-pickling step.

12. A method according to any one of claims 7 to 11, wherein at least alkaline waste liquid discharged from the degreasing step and acidic waste liquid discharged from the acid-pickling step are mixed and neutralized, and dilute alkaline waste liquid discharged from the cold water-washing step subsequent to the degreasing step and dilute acidic waste liquid discharged from the cold water-washing step subsequent to the acid-pickling step are mixed and neutralized.

13. A method according to any one of claims 7 to 12, further comprising a hot water-washing step performed prior to the degreasing step to effect removal of a deposited substance.

14. A method according to any one of claims 7 to 13 further comprising a neutralizing step performed subsequent to the cold water-washing step after the degreasing step to effect perfect neutralization and removal of an alkali component.

15. A method according to any one of claims 7 to 14, further comprising a rust-preventing step performed subsequent to the cold water-washing step after the acid-pickling step.

16. A method according to any one of claims 1 to 15, further comprising amassing N pieces of the plumbing device made of a copper alloy as one unit, arraying the N pieces in a container so as to prevent them from forming an air pocket therein, and simultaneously treating them in each of component steps.

17. A method according to any one of claims 1 to 16, wherein component parts resulting from forging or from forging and subsequent machining are individually subjected to both or either of deleading treatment and nickel-removing treatment and the treated component parts are assembled into a finished product.

18. A method according to any one of claims 1 to 17, wherein a finished product formed of a plurality of parts resulting from forging or from forging and subsequent machining is subjected to both or either of deleading treatment and nickel-removing treatment.

19. A method according to any one of claims 1 to 18, wherein the copper alloy that is subjected to both or either of deleading treatment and nickel-removing treatment is brass or bronze.

20. A method according to any one of claims 1 to 19, wherein the plumbing device is a device that has a surface thereof subjected to plating treatment using a nickel-containing alloy.

21. A plumbing device made of a copper alloy containing lead that includes a valve and a tube coupling having at least a liquid-contacting part washed with a cleaning fluid incorporating therein nitric acid and hydrochloric acid as an inhibitor under conditions of a temperature and a duration permitting effective removal of lead, thereby deleading a surface of the liquid-contacting part and causing the hydrochloric acid to form a coating film on the surface of the liquid-contacting part to effectively preclude elution of lead from the surface of the liquid-contacting part in the presence of the coating film.

22. A plumbing device made of a copper alloy containing both or either of lead and nickel that includes a valve and a tube coupling, having at least a

liquid-contacting part washed with a cleaning fluid incorporating therein nitric acid and hydrochloric acid as an inhibitor under conditions of a temperature and a duration permitting effective removal of both or either of lead and nickel, thereby performing at least one of deleading treatment and nickel-removing treatment for a surface of the liquid-contacting part and causing the hydrochloric acid to form a coating film on a surface of the liquid-contacting part to thereby effectively precluding elution of both or either of the lead and nickel from the surface of the liquid-contacting part in the presence of the coating layer.

23. A plumbing device made of a copper alloy that includes a valve and a tube coupling successively treated in at least a degreasing step, a cold water-washing step subsequent to the degreasing step, an acid-pickling step, and a cold water-washing step subsequent to the acid-pickling step.

24. A plumbing device made of a copper alloy that includes a valve and a tube coupling, successively treated in at least a degreasing step, a cold water-washing step subsequent to the degreasing step, a plating step, an acid-pickling step and a cold water-washing step subsequent to the acid-pickling step.

25. A plumbing device according to claim 24, further treated in a deleading step prior to the plating step.

26. A plumbing device according to any one of claims 23 to 25, further treated in a hot water-washing step prior to the degreasing step to effect removal of a deposited substance.

27. A plumbing device according to any one of claims 23 to 26, further treated in a neutralizing step subsequent to the cold water-washing step following the degreasing step to perfectly neutralize and remove an alkali

component.

28. A plumbing device according to any one of claims 23 to 27, further treated in a rust-preventing step subsequent to the cold water-washing step after the acid-pickling step.

29. A plumbing device according to any one of claims 21 to 28, comprising component parts forged, or forged and subsequently machined, individually subjected to both or either of a deleading treatment and a nickel-removing treatment, wherein the treated component parts are assembled into a finished product.

30. A plumbing device according to any one of claims 21 to 29, comprising a plurality of parts cast, or cast and subsequently machined, and subjected to either or both of a deleading treatment and a nickel removing treatment.

31. A plumbing device according to any one of claims 21 to 30, wherein the copper alloy treated by both or either of a deleading treatment and a nickel-removing treatment is brass or bronze.

32. A plumbing device according to claim 31, wherein the brass is a material proofed against elution of zinc.

33. A plumbing device according to any one of claims 1 to 32, wherein the plumbing device has a surface thereof plated with a nickel-containing alloy.

34. A treating fluid for cleaning at least a liquid-contacting part of a plumbing device made of a copper alloy containing both or either of lead and nickel to remove both or either of lead and nickel, comprising a mixed

acid incorporating therein nitric acid as a cleaning fluid and hydrochloric acid as an inhibitor.

35. A treating fluid according to claim 34, wherein the plumbing device is a device having a surface thereof plated with a nickel-containing alloy.